

REMARKS

This Amendment is in response to the Office Action dated September 30, 2005. In the Office Action:

- amendment of the abstract is suggested;
- Claims 1-17 are rejected under 35 U.S.C. §103(a) as unpatentable over Subramony et al. (US 6,713,127) in view of Meikle et al. (US 6,472,323); and
- Claims 1-17 are also rejected under 35 U.S.C. §103(a) as unpatentable over Laxman et al. (US 5,976,991)

In this amendment, the abstract has been amended according to the suggestion from the Examiner. Further, Claims 1, 2, 7-9, 11, and 16-17 have been amended and Claims 18-20 are added. These amendments are supported by the specification, figures and/or original claims. Applicants respectfully submit that this amendment does not introduce new matter. Upon entry of this Amendment, Claims 1-20 will be pending.

Applicants respectfully traverse the Examiner's rejection of the claims and submit that the present claims are patentable in light of the references cited in the Office Action. Specifically, Claim 1 as amended is patentable over Subramony and Meikle. Neither of these references discloses or reasonably suggests a method of depositing a silicon based film on a wafer by introducing at least one silicon containing precursor and at least one chemical precursor into a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber, which houses the wafer and has a plurality of heating elements above the wafer, and by applying energy to the plurality of heating elements to heat the wafer to a temperature of 400-500 °C, to achieve a deposition rate of 1000 Angstrom or greater.

Subramony discloses methods of depositing oxide and oxynitride films in thermal low-pressure chemical vapor deposition (LPCVD) apparatus 400. As described in Subramony, apparatus 400 has a chamber body 445 constructed of aluminum and including passages 455 for water (or a mixture of water and ethylene glycol) to be pumped therethrough to cool chamber 445. The water passages enable the apparatus 400 to be a "cold-wall" reactor chamber (col. 4, lines 9-19). Therefore, Subramony specifically teaches away from using a hot-wall chamber to

deposit the oxide and oxynitride films, and cannot be combined with Meikle's hot-wall feature to reject Claim 1.

Furthermore, neither the thermal LPCVD apparatus in Subranmony nor the deposition chamber in Meikle includes a plurality of heating elements, and neither Subranmony nor Meikle discloses or teaches the claimed features that at least one silicon containing precursor and at least one chemical precursor are introduced into a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber housing [a] the wafer and having a plurality of heating elements above the wafer, and that energy is applied to the plurality of heating elements to heat the wafer to a temperature of 400-550 °C. In Subranmony, the wafer is heated using a heater pocket 405 acting as a substrate holder and positioned on a resistive heater 480 under the wafer instead of above the wafer (col. 4, lines 20-30).

Therefore, Claim 1 as amended is patentable over Subranmony in view of Meikle.

Claim 1 as amended is also patentable over Laxman. Laxman does not disclose or teach, among other things, the claimed feature that at least one silicon containing precursor and at least one chemical precursor are introduced into a single-wafer hot-wall rapid-thermal chemical vapor deposition chamber having a plurality of heating elements above the wafer. In Laxman, the deposition is carried out in a tube reactor able to house eighty 100 mm diameter silicon wafers at 9 mm spacing in standard diffusion boats (col. 7, lines 47-49). Laxman also does not disclose or teach, among other things, the claimed feature that energy is applied to the plurality of heating elements above the wafer to heat the wafer to a temperature of 400-550 °C because no such heating elements is disclosed as being associated with the tube reactor in Laxman. Therefore, Claim 1 as amended is patentable over Laxman.

Claims 2-10 depend from Claim 1 and are patentable for the same reasons as Claim 1 and by reasons of the additional limitations set forth therein.

The arguments regarding Claim 1 apply to Claim 11 as amended. Therefore, Claim 11 as amended is also patentable.

Claims 12-16 depend from Claim 11 and are patentable for the same reasons as Claim 11 and by reasons of the additional limitations set forth therein.

The arguments regarding Claim 1 apply to Claim 17 as amended. Additionally, Claim 17 is also patentable over Laxman because, in Laxman, bis(tertiarybutylamino) silane is used as the silicon source gas, and Laxman does not teach or disclose the claimed feature of conveying at least one silicon containing precursor comprised of any one of, or combination of SiH_4 , SiCl_2H_2 , Si_2H_6 , Si_2Cl_6 , SiCl_3H , or SiCl_4 . Therefore, Claim 17 as amended is also patentable.

New Claims 18-20 depend from Claim 17 and are patentable for the same reasons as Claim 17 and by reasons of the additional limitations set forth therein.

Based on the foregoing, Applicants respectfully submit that the application is now in condition for allowance. If any matters can be resolved by telephone, the Examiner is invited to call the undersigned attorney at the telephone number listed below. The Commissioner is authorized to charge any additional fees to Deposit Account No. 50-2319 (Order No. A-71730/MSS (463035-878)).


Respectfully submitted,

DORSEY & WHITNEY LLP

Dated: December 30, 2005

Customer No. 32940
Dorsey & Whitney, LLP
Intellectual Property Department
555 California Street, Suite 1000
San Francisco, CA 94104-1513
(650) 757-1717 (telephone)
(650) 857-1288 (facsimile)
4853-2001-5360\1

By:



Jamie J. Zheng
Registration No. 51,167